



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,649	10/06/2003	Bhaskar Ramamurthy	2003P07776US01	3931
7590 04/20/2005			EXAMINER	
Siemens Corporation Intellectual Property Department 170 Wood Avenue South Iselin, NJ 08830			JAGAN, MIRELLYS	
			ART UNIT	PAPER NUMBER
			2859	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

1-1-A

Office Action Summary	Application No.	Applicant(s)	
	10/679,649	RAMAMURTHY ET AL.	
	Examiner	Art Unit	
	Mirellys Jagan	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 3-7, 12, 15-22, 25, 26, 30-32 and 34-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 13, 14, 23, 24, 28 and 33 is/are rejected.
- 7) ☒ Claim(s) 8-11, 27 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/6/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group 1 in the reply filed on 11/5/04, and Species 1 in the reply filed on 12/14/05 is acknowledged. Claims 15-22, 30-32, and 34-39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, and claims 3-7, 12, 25, 26, and 40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species.
2. The election/restriction requirements stated in the Office action, dated 10/12/04, is hereby repeated and thus made **FINAL**.

Claim Objections

3. Claims 1, 2, 8-11, 13, 23, 24, 27-29, and 33 are objected to because of the following informalities:

In claim 1, step (c), it is not clear what part of step (b) is being referred to by "in response to (b)", e.g., is the temperature state determined based on the 'property' or on the 'received signals' of step (b)?

In claim 2, it is not clear what is being determined in line 5, e.g., the term "determining" should be changed to --determining the property--. Also, it is not clear how the received signals are "on connections" in line 6, e.g., "the received signals" could be changed to --the received signals being received--.

In claim 8, it is not clear if the claimed step is performed in addition to step (b), or if it is referring to the property determined in step (b), e.g., is the temperature-dependent property determined in step (b) the acoustic property of a lens or window?

In claim 9, it is not clear what the acoustic energy is being transmitted to, e.g., is the beamformer transmitting acoustic energy to the transducer?

In claim 23, "temperature" should be changed to --temperature state-- in order to provide proper antecedent basis for the claim language.

In claim 28, it is not clear what is being referred to by "multiple firings", since claim 1 does not claim that anything is being 'fired', i.e., transmitted. Also, there is lack of antecedent basis in the claim for "measuring" in line 2, e.g., "measuring" should be changed to --determining the property--.

In claim 29, there is lack of antecedent basis in the claim for "apertures". It is not clear if these apertures are referring to part of the transducer. Also, it is not clear what is being referred to by "multiple firings", since claim 1 does not claim that anything is being 'fired', i.e., transmitted. Furthermore, there is lack of antecedent basis in the claim for "measuring" in line 6, e.g., "measuring" should be changed to --determining the property--.

Claims 10, 11, 13, 24, 27, and 33 are objected to for being dependent on an objected base claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2859

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 13, 14, 23, 24, 28, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,370,121 to Reichenberger et al [hereinafter Reichenberger].

Referring to claims 1, 2, 13, 23, 24, 28, and 33, Reichenberger discloses a method of determining a temperature of an ultrasound transducer, the method comprising:

receiving signals from a transduction element of the transducer (18);

determining a temperature-dependent property (acoustic impedance) of the transducer from the received signals; and

determining a temperature state of the transducer above a preset limit (temperature change selected with regulator 24) based on the property; and

initiating a series of actions (regulating acoustic power) based on the temperature state;

wherein the transducer is connected (e.g., cable) to an ultrasound imaging system (1) such that the connection connects the transduction element of the transducer to a receiving channel; the property is determined with components in the imaging system; the signals from the transducer are received on connections also used for acoustic imaging signals; the temperature state is determined with components of the transducer also used for ultrasound imaging; and the temperature state is determined without added devices, e.g., temperature sensors, in the transducer for temperature measurement; signals from the transducer are received associated with multiple firings, i.e., during sequential imaging, and the property is determined from a combination of the received signals (see figures 1 and 2; column 8, line 58-column 9, line 22; column 5, lines 48-55; column 6, lines 6-15; and column 8, lines 24-32 and 42-61).

Art Unit: 2859

Referring to claim 14, Reichenberger discloses a method of determining a temperature of an ultrasound transducer, the method comprising:

connecting elements of the transducer (18) to an ultrasound imaging system (1); and
determining a temperature of the transducer with components in the imaging system using signals on connections that are also used for acoustic imaging signals.

6. Claims 1, 2, 14, 23, 24, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,936,308 to Fakukita et al [hereinafter Fakukita].

Referring to claims 1, 2, 23, 24, and 28, Fakukita discloses a method of determining a temperature of an ultrasound transducer, the method comprising:

receiving signals from a transduction element of the transducer (1);
determining a temperature-dependent property (timing) of the transducer from the received signals; and
determining a temperature state of the transducer based on the property;
wherein the transducer (1) is connected to an ultrasound imaging system such that the connection connects the transduction element of the transducer to a receiving channel; the property is determined with components in the imaging system; the signals from the transducer are received on connections also used for acoustic imaging (tomographic) signals; the temperature state is determined with components of the transducer that are also used for imaging; the temperature state is determined without added devices, e.g., temperature sensors, in the transducer for temperature measurement; and receiving signals associated with multiple firings, i.e., first and second pulses (2, 3), and determining the property from a combination of the

Art Unit: 2859

received signals from the firings (see figure 2; column 3, lines 28-55; column 8, line 47-column 9, line 15).

Referring to claim 14, Fakukita discloses a method of determining a temperature of an ultrasound transducer, the method comprising:

connecting elements of the transducer (1) to an ultrasound imaging system; and
determining a temperature of the transducer with components in the imaging system using signals on connections that are also used for acoustic imaging (tomographic) signals.

Allowable Subject Matter

7. Claims 8, 27, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and amended to overcome the objections set forth in this Office action.

8. Claims 9-11 would be allowable due to their dependence on allowable base claim 8 if amended to overcome the objections set forth in this Office action.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or suggest the following in combination with the remaining limitations of the claims:

A method of determining a temperature of an ultrasound transducer, the method comprising:

Art Unit: 2859

determining an acoustic property of a lens or window of the transducer (see claim 8);
determining a temperature-dependent property of the transducer from the received signals
for a plurality of locations along a lens or window of the transducer (see claim 27); or
shifting at least a first one of the received signals relative at least a second one of the
received signals (see claim 29).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents and publications disclose an ultrasound transducer system:

U.S. Patent 4,754,760 to Fukukita et al

U.S. Patent 6,623,430 to Slayton et al

U.S. Patent 5,624,188 to West

U.S. Patent 6,142,946 to Hwang et al

U.S. Patent 5,360,268 to Hayashi et al

U.S. Patent 4,469,450 to DiVincenzo

U.S. Patent 5,788,636 to Curley

U.S. Patent Application Publication 2003/0204141 to Nock et al

U.S. Patent Application Publication 2004/0102703 to Behren et al

U.S. Patent Application Publication 2004/0127791 to Mast et al

U.S. Patent Application Publication 2003/0176789 to Kaplan

U.S. Patent Application Publication 2003/0028113 to Gilbert et al

U.S. Patent Application Publication 2004/0267137 to Peszynski et al

U.S. Patent Application Publication 2004/0073113 to Salgo et al


Art Unit: 2859

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 571-272-2247. The examiner can normally be reached on Monday-Friday from 11AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
April 14, 2005


GAIL VERBITSKY
PRIMARY EXAMINER